Are Laboratory Hydrates Analogs of in-situ Hydrates?

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Natural hydrates contain the world's largest supply of fossil fuel. In-situ samples analyzed from Hydrate Ridge (seafloor off Oregon) are reported using X-ray diffraction, NMR, and Raman spectroscopy. Previous work showed that there is a hydrate solid solution range on the methane phase diagram. Raman spectroscopy measured a difference in the hydrates formed in a gas-rich environment (laboratory hydrates) and a water-rich environment (naturally occurring hydrates). By investigating the properties of the in-situ hydrates, including cage occupancy and structure, parallels and differences can be drawn between real and synthetic hydrates.